

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
6 May 2004 (06.05.2004)

PCT

(10) International Publication Number  
**WO 2004/037497 A1**

(51) International Patent Classification<sup>7</sup>: **B25J 13/02**,  
13/08, G01L 1/24, 5/16

Allen [AU/AU]; 10A Normurra Avenue, NORTH TUR-  
RAMURRA, New South Wales 2074 (AU).

(21) International Application Number:  
PCT/AU2003/001420

(74) Agent: **GRIFFITH HACK**; GPO Box 4164, SYDNEY,  
New South Wales 2001 (AU).

(22) International Filing Date: 28 October 2003 (28.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
2002952290 28 October 2002 (28.10.2002) AU

(71) Applicant (for all designated States except US): **SPATIAL  
FREEDOM HOLDINGS PTY LTD** [AU/AU]; Level 5,  
14 Martin Place, SYDNEY, New South Wales 2000 (AU).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,  
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,  
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT,  
RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,  
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

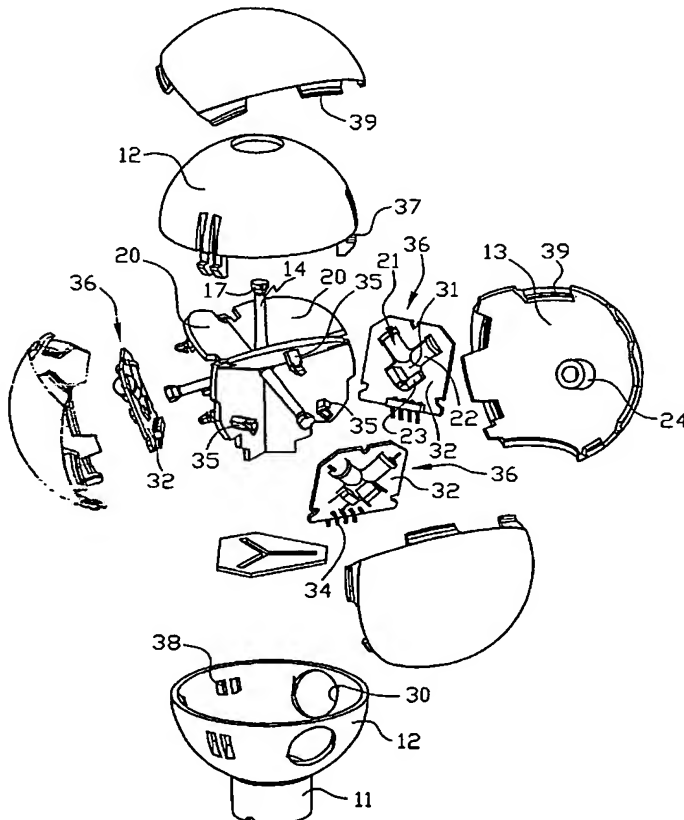
(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,

(72) Inventor; and

(75) Inventor/Applicant (for US only): **HILTON, John**,

[Continued on next page]

(54) Title: **THREE-DIMENSIONAL FORCE AND TORQUE CONVERTER**



(57) Abstract: A three-dimensional force and torque converter unit for measuring an external force or torque applied to the unit and converting it into a signal, whereby the signal may be used to control a system or device incorporating the converter unit. The converter unit includes a controller formed with four spaced apart arms having six or more degrees of constraint. A force or torque may be applied to the tip portions of each of the arms via a gripping means. Sensors are used to measure the deflection of the arms under an applied loading or torque and an output signal is generated.

WO 2004/037497 A1



SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— with amended claims and statement

**Published:**

— with international search report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*